BLM LIBRARY
88047603

RAPTOR SURVEY IN THE RAWLINS AND ROCK SPRINGS DISTRICTS, WYOMING

Wildlife Staff Technical Report
Denver Service Center
Division of Standards and
Technology

QL
696
.F3
R378
1976

Bureau of Land Management
Library
Denver Service Center

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

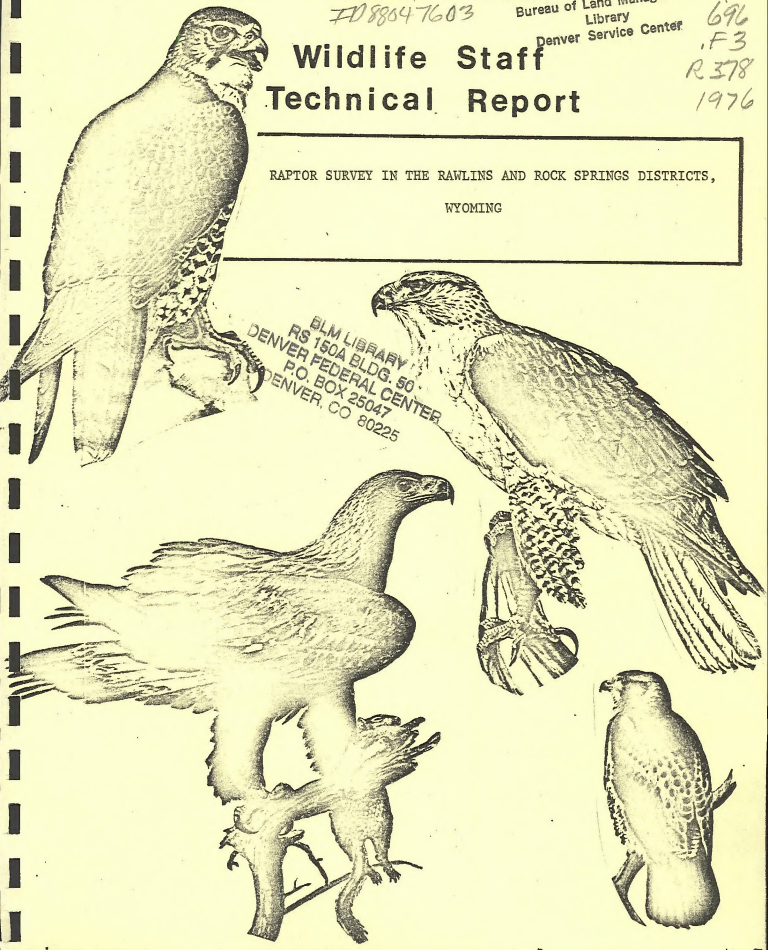
DENVER SERVICE CENTER

DIVISION OF STANDARDS AND TECHNOLOGY

ID 88047603
Bureau of Land Management
Library
Denver Service Center
QL
696
.F3
R378
1976

Wildlife Staff Technical Report

RAPTOR SURVEY IN THE RAWLINS AND ROCK SPRINGS DISTRICTS, WYOMING



BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

RAPTOR SURVEYING IN THE RAWLINS AND ROCK SPRINGS DISTRICTS OF WYOMING, May 17-21, 1976

On the morning of May 17, 1976 I met George Hollis, WSO, at Laramie at 6:20 a.m. and we proceeded to Rawlins, Wyoming, arriving there at about 8:15 a.m. Enroute we observed several old stick nests of birds of prey, as well as one red-tailed hawk nest in a clump of trees just south of the Freeway and about 15 miles east of Rawlins. An adult bird was on the nest.

At the Rawlins District Office I presented a slide lecture on raptor identification and raptor nesting habitat for the various species, emphasizing the need to protect nesting sites from various types of human disturbance during the critical nesting period. I stated that one of the most important reasons for needing to identify nesting sites in the district is to be able to protect them against development activities, such as road construction, trail building, development of water for livestock, oil and gas exploratory activities, ORV activities, etc. until the birds have fledged (flown from the nest). Many times these activities may be delayed until after the nesting season with little inconvenience, but this option cannot be exercised unless primary nesting areas for the various species of birds of prey have previously been identified. During the week it was observed that certain areas are key for the nesting of one or more species of raptors, because of highly suitable nesting habitat or adjacent prey base, while other large areas of desert have very sparse populations of nesting birds.

At about 10:15 a.m. George Hollis, Bob Welch, Phil Garrett, Mat Kniesel, and I left the district office to examine raptor habitat in the Red Desert and to discuss surveying techniques. All of the area and district personnel were highly interested in raptor habitat requirements and had identified some nesting sites which we later visited. During the course of the day we examined habitat around Eagle's Nest Draw, Cyclone Rim, Sulphur Creek, P. B. Spring, Sweetwater River, and adjacent areas.

Near Eagle's Nest Spring we photographed a ferruginous hawk (Figures 1-3) on a nest on a clay pinnacle. She must have been on eggs that were very near to hatching as she did not flush from the nest, even when approached to within four feet. We left her without knowing whether the eggs had hatched or not. This was the first time I had ever approached so closely to a brooding ferruginous hawk without flushing the bird from the nest. My primary purpose for approaching nests closely during this field trip was to determine average egg-laying, hatching, and fledging dates for the various raptors in Wyoming. This information is needed for future surveying and land management planning (i.e., when can various activities be permitted without loss of nesting birds?).

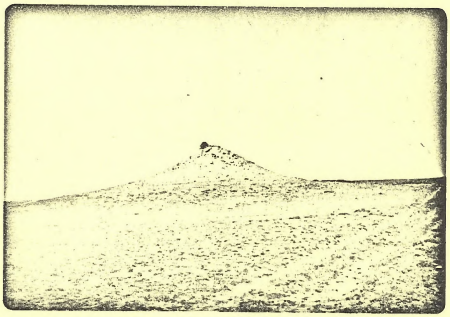


Figure 1. Ferruginous hawk nest at Eagle's Nest Spring on a clay pinnacle which has probably been used in past years by golden eagles. Rawlins District.

Figure 2. Phil Garrett photographing ferruginous hawk at Eagle's Nest Spring. We approached to within four feet of the nest without flushing the bird. Rawlins District.

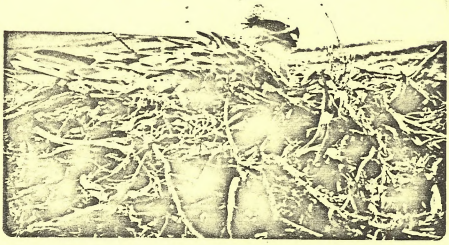


Figure 3. Ferruginous hawk at Eagle's Nest Spring. The female never left the nest and we suspected that the eggs must have been right at the hatching stage. Photograph taken within 3 to 4 feet of bird.

Figure 4. Two eaglets in nest on rocky bluff above Sulphur Creek., Rawlins District, May 17, 1976.

Phil stated that he had found one ferruginous hawk nest containing five eggs that had been abandoned this spring because an oil drilling operation had been set up nearby.

As we crossed the Red Desert we stopped frequently to look over distant structures on ridges and rocky points that appeared to be stick nests of ferruginous hawks. Some of the men were not aware that ferruginous hawks commonly build their nests on the open ground. We found many such structures in the vicinity of Cyclone Rim. A total of eight marsh hawks were observed on the desert, mostly in the vicinity of Cyclone Rim and north. These birds almost always build their nests on the ground on sagebrush or grassy flats and are difficult to locate. We visited an eagle nest on Sulphur Creek that contained two eaglets, approximately 10-14 days old. The canyon here was excellent nesting and feeding habitat for both eagles and prairie falcons, containing rocky rims with a stream running along the floor of the narrow valley (Figures 4 & 5).

From Sulphur Creek we drove westward to P. B. Spring where we located an active golden eagle nest containing two young eaglets (visible with binoculars). An old nest observed farther west along the cliff line could have been an alternate eagle nest or a ferruginous hawk nest. These cliffs were about 100 feet high and were excellent eagle nesting habitat with good feeding areas nearby (Figure 8).

Much of the Red Desert has good sagebrush understory vegetation which provides habitat for rabbits and various rodents. While this provides good feeding areas for birds of prey after fledging of the young and during winter, there are vast areas with habitat suitable for nesting only for ferruginous hawks and marsh hawks. While golden eagles will very rarely build their nests on the ground on the ends of low ridges, their primary nesting habitat consists of either high trees or high rocky cliff lines which are largely lacking in the Red Desert. Eagles may also build their nests on man-made structures such as windmills, but eagles have not been reported using such sites in the Red Desert.

We crossed the Sweetwater River approximately 15-20 miles southeast of Atlantic City. It appeared that the canyon downstream would be excellent nesting habitat for golden eagles, ferruginous hawks, prairie falcons, and kestrels. The adjacent stream valley enclosed within the rocky canyon walls, as well as the sagebrush flats extending outwards from the canyon, would be excellent feeding areas for all of these species.

On May 18 George Hollis, Monty Woody, Phil Garrett, and I left Lander on Highway 287 and 789, headed for the Beaver Rim and Sweetwater Rocks. About six to eight miles southeast of Lander we stopped at some high cliffs where we observed an old red-tailed hawk nest and two or three old prairie falcon eyries. No raptors were observed here, but many

Figure 5. Photograph of rocky bluff which contained an active eagle nest on Sulphur Creek and the stream bottom that provided an excellent hunting area for the eagles. Rawlins District, May 17, 1976.

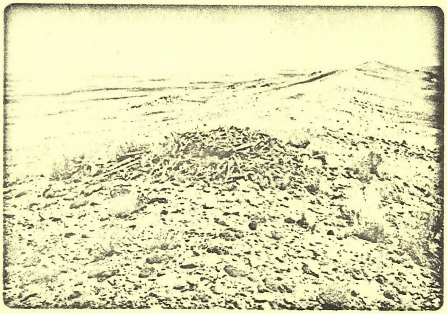


Figure 6. Ferruginous hawk nest directly on ground on a low ridge in the Cyclone Rim area. Ground nesting is very common in Wyoming in desert regions. Note wooden slats incorporated into nest structure.

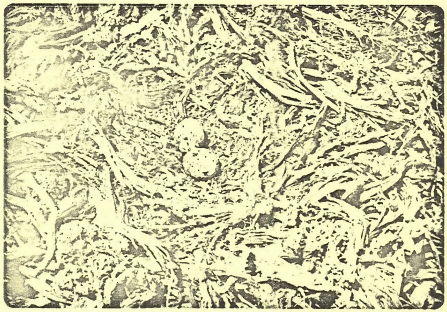


Figure 7. Two eggs were present in the nest shown in Figure 6. Chunks of cow manure (dried) may be seen in the nest structure, which is commonly used by ferruginous hawks in nest construction. Rawlins District, May 17, 1976.

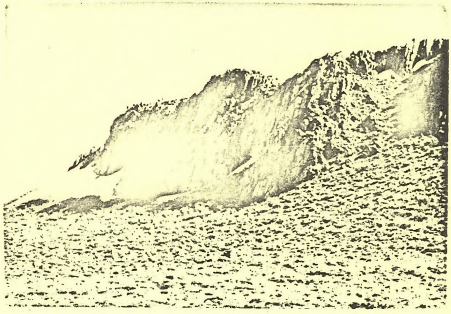


Figure 8. Cliff line which contained an active eagle nest with two young eaglets at P. B. Spring. Rawlins District, May 17, 1976.

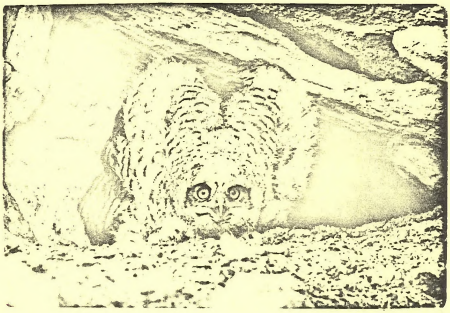


Figure 9. A great-horned owlet, about three-fourths grown, in nest hole in a sandstone bluff in the Lander Resource Area, Rawlins District, May 18, 1976.

cliff swallows and white-throated swifts were present. Many old cliff swallow nests could be seen beneath the overhangs.

A short distance farther on we turned up a side canyon to the north which contained upthrust sandstone (?) outcroppings up to 100 feet high. Here Monty pointed out a large hole in one outcropping that contained a prairie falcon nest last year. Phil saw a prairie falcon fly up over the ridge as we approached the site. We could not determine whether or not the site was active this year.

About 200 yards farther up the canyon we noticed a great horned owl perched on a ledge near a hole in the ledge. We climbed up to the spot and found two young owls about two-thirds grown. Parts of rabbits had been stuffed back into the rear of the nesting hole. Both parents quickly departed as we started up the hill for the nest site and never reappeared. Figure 9 shows the nesting site and young. The many eroded holes in the upthrust ledges were excellent nesting habitat for a variety of owls and probably contained several nests.

Returning to the highway, we traveled a few miles farther on and then turned off to the left onto an old side road. About one-half mile along we sighted an eagle nest that Monty said was active the previous year. An adult flew from the nest as we approached; eggs were probably present.

About one-half mile farther on Monty pointed out what he named prairie falcon site no. 1. As we watched, the female left the ledge and flew over us uttering loud distress calls. She probably had eggs at this time. We left her and drove up onto the Beaver Rim where Monty showed us two additional sites that had been active last year. A prairie falcon flew out from one of the sites where it is probably nesting. A second falcon joined her and both remained close by. A couple of kestrels were also observed near the rim. These are high cliffs, dropping perhaps 200-300 feet on the north side. Mining of some kind has been proposed on the north side of the rim. If this occurs, the prairie falcons will probably abandon these sites. Additional falcons probably inhabit the long rim and additional surveys should be conducted to determine the total annual nesting population of raptors along this rim.

Just west of Sweetwater Station we located a ferruginous hawk nest about 300 yards north of the highway. It was on a small clay pinnacle and contained four eggs. Monty stated this was the first ferruginous hawk nest found in his resource area by district personnel. I advised that it not be visited again until after the eggs hatch, or about June 10, to lessen the chance of abandonment. Ferruginous hawk nests may be located but should not be visited, except for special purposes, until after the young hatch. The young are very active and can easily be observed at some distance with binoculars after they

are a week or two old. They may then be visited to ascertain productivity with little chance of abandonment (Figures 10 & 11).

As we reached the west end of the Sweetwater Rocks Monty took us to a prairie falcon eyrie that was active last year and had a pair there again this year (Figure 12). A pair of red-tailed hawks were seen at the head of a canyon near there and probably had a nest, but it was too far to hike into in a short time.

To this point in the trip we had observed three ferruginous hawk nests, all of which had eggs; three golden eagle nests, all of which had young; and three prairie falcon eyries which were not examined, but which probably had eggs at this early date.

As we proceeded .. to and past Split Rock, we saw several "whitewashed" areas near ledges or holes that were probably prairie falcon nesting sites, either old or active. Some of the "whitewashed" areas may also have been turkey vulture roosting sites. In searching for either prairie or peregrine falcon eyries, the observer watches for "whitewash on the cliff faces which is the birds' excrement and which builds up with continuous or periodic use. We continued on around the south side of the Sweetwater Rocks, to the east end of the major formation, and then across the north side (at some distance from the mountain). All the way around the granite formation we periodically observed small areas of whitewash below ledges or holes that were probably prairie falcon nesting sites. Most of the whitewash was above the middle portion of the mountain, with some near the very top. It is estimated that there are probably at least eight pairs of prairie falcons around the Sweetwater Rocks formation that we examined, but this could only be verified by extensive climbing.

On the morning of May 19 George Hollis, Monty Woody, and I left Lander for the North Fork of the Popo Agie where a local resident of the canyon, Mr. John Barber, had reported seeing peregrine falcons on several occasions during the past two years. Mr. Barber proved to be fairly knowledgeable of birds and spent considerable time watching them at his bird feeders and in the canyon. He offered to take us across the private lands and farther up into the canyon, which we accepted. The canyon was wide and the cliffs reached perhaps a thousand feet above the canyon floor. The North Fork is a large stream, about fifty feet across, with considerable vegetation along the banks, including cottonwoods, willows, alders, aspen, and sagebrush. Whitewash was observed at a few locations on the north side of the canyon. It appeared to be excellent habitat for peregrine falcons and they have probably inhabited this canyon in the past. It would not be surprising to learn that peregrines were still living in the canyon, although we did not find any. The canyon widens out at the head and contains good feeding areas for falcons.

Figure 10. Phil Garrett, Rawlins District, examining ferruginous hawk nest just west of Sweetwater Station and about 300 yards north of highway.

Figure 11. The ferruginous hawk nest shown in Figure 10 contained four eggs on May 17, 1976.

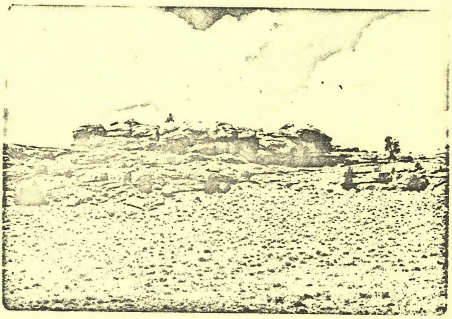


Figure 12. A prairie falcon eyrie near the west end of the Sweetwater Rocks that produced young in 1975 and was active on May 18, 1976. Rawlins District, May 18, 1976.

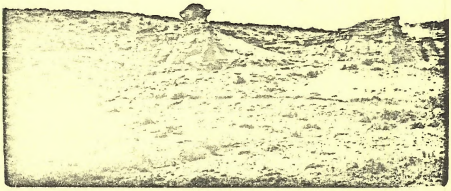


Figure 13. Ferruginous hawk nest on rocky point about ten miles north of Farson, Wyo. The nest was only about forty yards west of the highway and contained two eggs. Rock Springs District, May 19, 1976.

In our close-out session with Dale Brubaker, Area Manager, Lander Resource Area, we emphasized that we are primarily concerned with the more sensitive species of raptors, those that tend to abandon their nesting sites with increasing human activities, including ORV's, mining and oil and gas activities, and other types of disturbances. Both ferruginous hawks and golden eagles will sometimes abandon their nesting sites during early nest-building or courtship phases and during early stages of egg-laying. At such times district personnel should not visit the nests. Production data may be obtained after the young hatch.

I told Mr. Brubaker that we really don't know much about the impacts of livestock grazing on feeding and/or nesting areas of birds of prey. Livestock grazing changes vegetative composition and density, which in turn changes the composition and density of prey species. However, most raptor populations seem to be doing well under current grazing practices, which in many areas includes overgrazing of the herbaceous vegetation, so it would be difficult to say that livestock grazing, by itself, has been seriously adverse to birds of prey. Removal of dense herbaceous vegetation makes prey species more vulnerable to aerial and ground predators, but overall, there is probably less total production of small rodents and rabbits. A compromise towards moderate livestock grazing with periodic periods of rest would probably be more beneficial to birds of prey than continuous spring or summer grazing each year. Winter livestock grazing probably has less impact on raptors than spring and summer grazing.

Rockclimbing and mining activities would probably be the two most adverse activities in the Sweetwater Rocks area. If rockclimbers start using areas where there are known prairie falcon or eagle eyries, we should close such areas until after the young are fledged, or until about July 20, at which time such activities could be permitted without adverse impacts on these birds. Exploratory mining operations should be discouraged within one-half mile of known raptor eyries and until after the young of the birds concerned have fledged.

Livestock grazing should have little adverse impact on the prairie falcons nesting along the Beaver Rim since they would be out of sight of the falcons while they were on their nests, and livestock operators would not disturb them so long as they did not walk along the very rim or throw objects out over the cliff.

We also discussed beaver habitat management on Green Mountain and I stated that there is no way we can meet our objectives in habitat management for beaver unless the Wyoming Game and Fish Commission will agree to remove sufficient beaver from the area to permit long-term maintenance of the habitat. If numbers can be kept down to about two per colony, the aspen supply will last for many years, particularly if there is also willow available. But if beaver are permitted to

increase at their normal rate, they may destroy all aspen at the site in just a few years. Only sufficient beaver should be retained to maintain the series of ponds in which they live. Dense willow habitat can maintain beaver almost indefinitely because it grows rapidly and resprouts readily. However, beaver numbers should still be controlled. Trout habitat can be maintained for a much longer period of time if the beaver are prohibited from destroying their habitat too quickly.

Upon leaving Lander George Hollis and I proceeded on south to meet Jim Dunder at 15-mile reservoir for a look at raptor habitat in Pine and Cedar Canyons. About ten miles north of Farson we located a ferruginous hawk nest about forty yards to the west of the highway. The nest contained two eggs. About five miles farther on a golden eagle nest was spotted on a pinnacle just west of the highway. The nest was about one and one-half miles north of the junction with Highway 28 and contained one egg which could be observed from a ridge just to the west of the nest pinnacle. About one mile farther on we passed a grove of trees (cottonwoods) about one-half mile to the west of the highway that contained an active red-tailed hawk nest. The golden eagle and ferruginous hawk nests are shown in Figures 13 - 15

We met Jim Dunder at 15-mile Reservoir and proceeded on to Pine Canyon. Jim mentioned that there was an active golden eagle nest and probably a great-horned owl nest near the top of the Boar's Tusk just to the north. Pine Canyon proved to be excellent habitat for a wide variety of raptors, especially owls and prairie falcons. Jim showed us where a prairie falcon had raised young last year and where a red-tailed hawk had nested successfully on the ground at the base of a low cliff. The entire canyon is a lattice-work or honeycomb of small eroded holes and ledges. Many owls undoubtedly nest in this canyon. Whitewash (excrement), probably from prairie falcons, was evident on several ledges and holes on both sides of the canyon. No prairie falcons were observed during the afternoon, but it was expected that at least two or three prairie falcon nests were present somewhere in the canyon. As we left the canyon, a ferruginous hawk took off from the ground, circled, and alighted on a hillside behind us.

We also drove into Cedar Canyon which had much the same erosion pattern as Pine Canyon with innumerable places for owls, kestrels, and prairie falcons to nest. It was late in the evening when we drove into Cedar Canyon and a couple of kestrels were the only raptors seen. Figure 16 shows the large number of holes and crevices created by wind and rain in these two canyons that are ideal for nesting for falcons and owls.

On May 20 George Hollis, Jim Dunder, and I left Rock Springs at 6:30 a.m. to examine raptor habitat in Canyon Creek, south of Rock Springs.

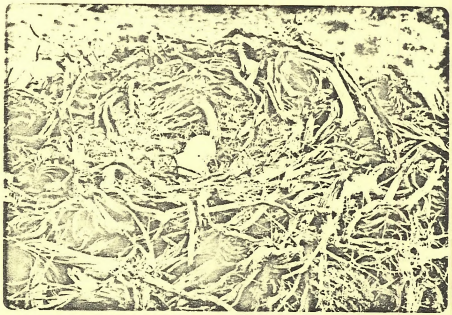


Figure 14. Ferruginous hawk nest shown in Figure 13, containing two eggs. Note shredded sagebrush bark in nest cup and chunk of dried cow manure on edge.

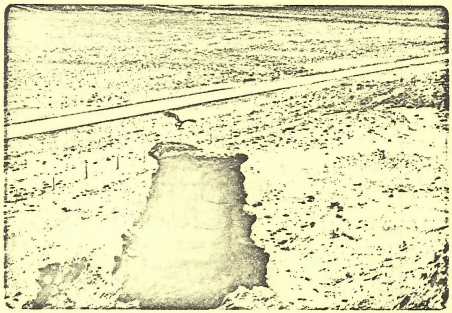


Figure 15. Active golden eagle nest about five miles north of Farson, Wyo., containing one egg. Note proximity to highway. Rock Springs District, May 19, 1976.

Enroute we observed an active golden eagle nest that Jim said was active last year also. "Whitewash" from prairie falcons was evident in many places along the cliffs along Highway 430. Time did not permit determination of current activity.

Most of the day was spent in the vicinity of Canyon Creek where we watched two active eagle nests and at least two active prairie falcon eyries. Jim pointed out areas where prairie falcons had raised young the previous year. Just our presence in the bottom of the canyon caused the birds to circle us frequently, emitting their distress calls. We also watched as a red-tailed hawk carried building material to an inconspicuous nest near the head of the canyon. Excrement on perches and probable nesting sites were evident in many places in the canyon and adjacent tributaries. Several stick nests were located, most of which were probably red-tailed hawks. Time did not permit determination of current activity. A pair of ferruginous hawks were observed near Salt Wells Creek as we headed back to Rock Springs but their nest was not located. See Figures 17 - 19.

On May 21 I presented a familiarization slide-talk to personnel of the Rock Springs District Office and then Jim Dunder, George Hollis, and I left to examine the Black Rock area and the vicinity of Oregon Buttes and Honeycomb Buttes. Spring Butte has very good cliff nesting habitat for eagles and prairie falcons on the south and east sides, and Black Rock has excellent raptor nesting habitat on all sides (Figures 20 through 22). We felt that Black Rock, at least, has sufficient values for birds of prey and other natural values that it should be withdrawn from all mineral and material sales activities. Whitewash was evident on all sides of the rock, indicating long-term use by birds of prey. The broken-up structure of the volcanic plug provides numerous nesting sites for many species of birds of prey.

On the south side of Steamboat Mountain, south of the sand dune, a cow elk was observed that had apparently had its left hind leg blown off by a hunter. It was only about two hundred yards from the road and quite capable of moving about.

We headed north, past the Bar-X Ranch, and on towards the Honeycomb Buttes. The ancient vehicle tracks in this area had scarcely been used in recent years. As we approached the buttes from the south, a severe storm struck which necessitated a decision to leave the area immediately. As we drove northwest along a portion of the highly eroded clay formations, we stopped periodically to examine structures with our binoculars, but because of the rain intensity, it was very difficult to identify nest structures. Even so, we located six or eight old nests, including one huge nest that was built up along the back side of a clay pinnacle that was probably ten to twelve feet high, probably an eagle nest. The sighting of so many old nests along only a small portion of the area indicates that several active nests

Figure 16. Pine Canyon contains excellent wind and water-eroded holes and crevices suitable for nesting by prairie falcons, kestrels, and various owls. Several active eyries were reported here last year. Rock Springs District, May 19, 1976.

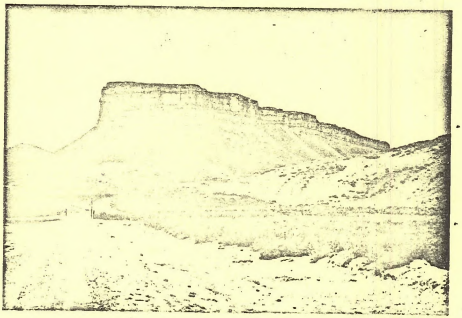


Figure 17. Entrance to Canyon Creek, Rock Springs District, showing high cliffs suitable for nesting by prairie falcons, golden eagles, red-tailed hawks, kestrels, and possibly peregrine falcons. May 20, 1976.

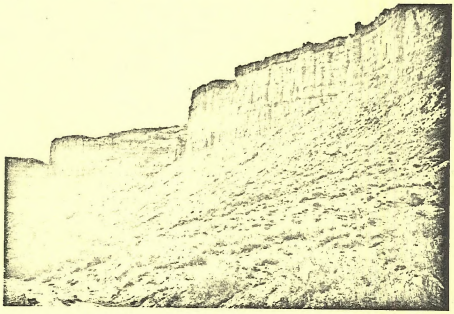


Figure 18. Rugged canyon walls within Canyon Creek, Rock Springs District, showing excellent habitat for cliff-nesting raptors. An active golden eagle nest was on these cliffs.

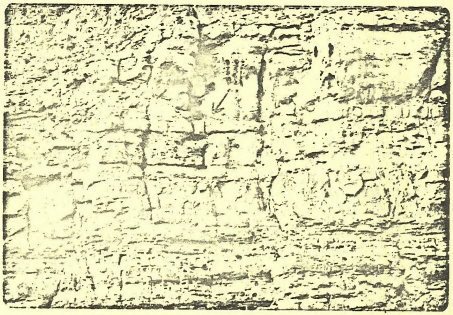


Figure 19. An old red-tailed hawk or golden eagle's nest now being used by prairie falcons. Young prairie falcons were successfully fledged here in 1975. Canyon Creek, Rock Springs District, May 20, 1976.

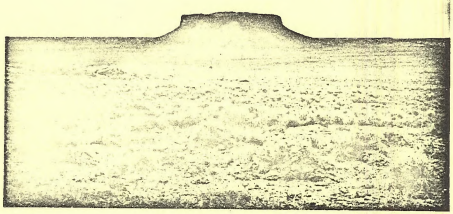


Figure 20. Black Rock in the Rock Springs District is an active and historic nesting site for prairie falcons, golden eagles, kestrels, and great horned owls. Excellent feeding areas extend in all directions.

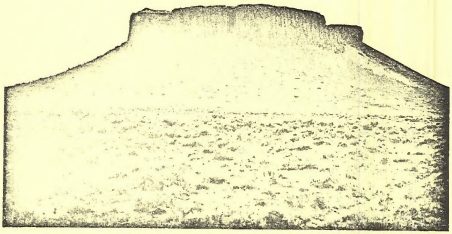


Figure 21. A view of the east side of Black Rock. Golden eagles and prairie falcons were observed on this side of the volcanic protrusion.

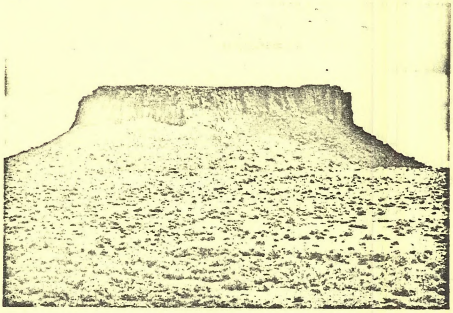


Figure 22. A view of the westerly side of Black Rock showing broken cliffs of volcanic origin that are ideal nesting sites for a variety of raptors. Rock Springs District, May 21, 1976.

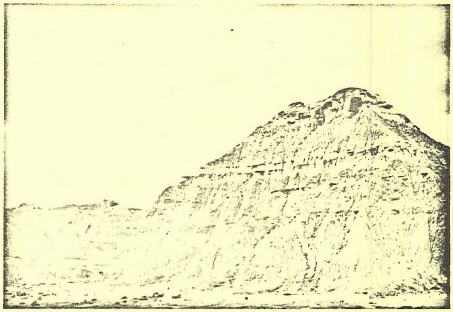


Figure 23. A small portion of the Honeycomb Buttes that are both scenic and valuable as nesting habitat for ferruginous hawks. Rock Springs District, May 21, 1976.

should be present in the 4-mile by 12-mile heart of this unique area. It should be examined more closely by recreation and wildlife resource specialists, and by the area manager, to ascertain special values that may require special management or protection. (Figure 23).

Rain and time forced us to head back towards Rock Springs. Enroute we sighted additonal nest structures or eyries on the Oregon Buttes and in the Pinnacles, as well as scattered nest structures on the points of ridges or washes enroute to the freeway north of Bitter Creek.

Near Point of Rocks we watched a female ferruginous hawk huddle in her nest in the driving rain. This nest was built on the crossbar of a power line (Figure 24).

Since this field trip two additional ferruginous hawk nests have been discovered: one just west of the Saratoga Junction on the south side of the Freeway, and one about five miles out of Laramie on some sandstone outcroppings about 400 yards to the north of the Freeway. Both held adult birds on the nests.

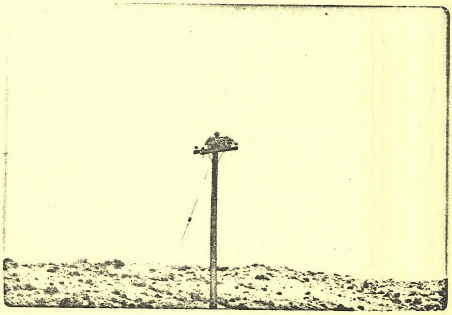


Figure 24. Ferruginous hawk nesting on a powerline pole about 34 miles west of Rawlins, Wyo., May 21, 1976. The nest had been present for at least one year prior.

RECOMMENDATIONS

Rawlins and Rock Springs Districts

1. Our knowledge of important bird habitat in these districts is still very limited. Although we have considerable information on important habitat areas for upland game birds and waterfowl, our knowledge and understanding of important habitat areas for birds of prey, shorebirds, and song and insectivorous birds is very lacking. In order to adequately assess impacts on these non-game bird species resulting from the multitude of authorized uses of the national resource lands, we will need to gather better data on species present, their life requirements, and habitat needs.

In order to assist in meeting these needs, I would recommend the following:

A. The district and area biologists should each be programmed to utilize at least two weeks each spring, preferably during late May or early June to gain additional knowledge of important raptor nesting and/or feeding habitat. Non-game species of wildlife are receiving added public interest each year, and it seems logical that we should plan to use at least 1/25th of our available time each year in learning more about their habitat needs and impacts of various authorized land uses on their survival.

B. Each area/district biologist should keep a record of all known raptor nesting sites in his area and/or district. Knowledge of all nesting sites should be exchanged between BLM and the personnel of the Wyoming Game and Fish Commission. All such sites should be checked for activity during late May or early June each year to determine general trends in raptor productivity. Alternate nesting sites within the same breeding territory should also be checked. Changes in productivity may indicate gradual changes in habitat condition that result in changes in the prey base. These changes may indicate a need for modifications in the land management programs of the area or district if the birds are to be perpetuated.

C. Any contracts for surveys of raptor nesting habitat should state that such surveys will not commence prior to May 20 of any given year to help preclude the possibility of nest abandonment.

D. Consideration should be given to postponing construction projects and other human disturbances that are to be conducted near (within 1/2 mile) known raptor nesting sites until after July 20 to reduce the possibility of nest abandonment, especially by the more sensitive raptors, e.g., ferruginous hawks, golden eagles, prairie falcons, peregrine falcons. It should be possible to plan most activities after this date. Miners and personnel engaged in oil and gas exploration should be encouraged to accept this suggestion also.

E. District/area biologists and other district personnel should generally avoid visiting raptor nests until after young are evident in the nest, unless a need exists for special photographs or data for training purposes or management.

F. All abandonment of nests and probable reasons should be documented (photographed, if possible). Destruction of eggs or young by vandals, predators, etc. should be documented.

G. An effort should be made to locate at least 50 raptor nests (combined species) in the district to check annually to try to detect subtle changes that may be occurring in the environment that may be adversely (or beneficially) affecting productivity. Changes in the environment of raptors that affect their productivity are generally considered to be factors that may also affect the well-being of human beings(presence of DDT/DDE in food chain, etc.).

Rock Springs District

A. Black Rock is an unusual granitic formation of volcanic origin that apparently has had high historical, as well as current, value as nesting habitat for golden eagles and prairie falcons. The broken character of this volcanic plug produces numerous holes and crevices that are highly suitable for nesting by owls also. The surrounding area, on every side, provides excellent foraging areas for all aerial predators. Since this area is, as yet, generally undisturbed by human activities, it is suggested that Black Rock and the area for one mile radius be withdrawn from mineral exploration and organized ORV activities, and any type of materials sales to preserve it as a raptor nesting area. This would not preclude grazing and associated activities. If suitable, the top of the rock might also be designated as a natural area.

Discussion: BLM has generally been reluctant to set aside even small areas specifically for wildlife. The Bureau's image is presently very low with the conservation factions because we have tended to be dominated by mining and livestock interests. It would be much better to improve our image by setting aside small key wildlife areas such as Black Rock, and possibly the top portions of Spring Butte, on our own initiative than to have other groups gradually recognize unique values on selected lands and apply pressure to have them set aside. All outstanding natural areas should be designated as protected sites to preclude eventual elimination of the inherent values.

B. Canyon Creek and other high-walled canyons in the southern part of the Rock Springs District are important nesting sites for golden eagles, prairie falcons, red-tailed hawks, and owls (kestrels are not specifically mentioned because they are common nesters in most canyons containing cliffs). Where possible, oil and gas drilling

should be delayed in the canyon bottoms and adjacent to the canyon rims until after raptor nesting is completed.

C. The Honeycomb Buttes are a highly unique area..... colorful, highly eroded (possibly containing paleontologic values), and an area that appears to be an important area for nesting of ferruginous hawks and golden eagles. While time and weather permitted only a brief look at a small portion of the southern edge of the area, six to eight stick nests were easily noted. The scenic values alone are worthy of preservation from surface disturbance activities.

D. Even with our brief visit, we noted several highly unique and interesting areas in the district that should invite special protection and/or management, including Spring Butte, Black Rock, the sand dunes, Oregon Buttes, Canyon Creek, Pine Canyon, and Honeycomb Buttes.

3. As part of my responsibilities at DSC, I will develop slide presentations that may be given by myself or others at district and/or state office workshops to increase knowledge on various bird species. Planned presentations include a series on small, unique birds of the NRL and the habitats they occupy; one on raptors and their nesting habitat; and one on waterfowl and their habitat requirements. It is expected these will be developed during the coming fiscal year.

4. I should be available for about one week at a time to assist state office and district personnel in bird identification sessions and/or field surveys for bird species. Efforts to date have been concentrated on raptors because of recent national interest centered on these species, but many other species must be given attention in the immediate future.

5. General information on egg-laying, hatching, and fledging dates for various birds of prey, food habits, and types of nesting habitat used by raptors is included in the report.

Prepared by: Mayo W. Call

Mayo W. Call, Avian Biologist
Denver Service Center

COMMON NESTING HABITAT OF WYOMING RAPTORS

GENERAL COMMENTS: (1) Watch cliff faces for "whitewash" (excretory products dropped on cliff faces by roosting, feeding, or nesting birds. In most areas this "whitewash" has been produced by birds of prey; however, in some areas it may be caused by various species of herons or other birds. Sometimes, in wet years especially, leaching of alkali or salts from the soils or rocks occurs and these substances must not be confused with bird droppings: this difference can be determined by observing the pattern of coloration with a good pair of binoculars.

(2) Watch for large structures of twigs and branches on cliff faces, in high trees, or on low rocky points or boulders in the desert, or even on the ground (especially on ridges or on top of cutbanks).

(3) Watch for any type of nest structure built on branches of trees or in mountain brush (especially oak and large mountain mahogany).

(4) In brush and trees, check to see if nest top is covered over (magpie) or open on top (all birds of prey).

Specific types of nesting habitat:

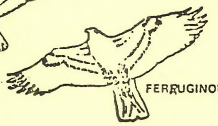
Golden eagles -	Cliffs and ledges, large dead snags, sometimes on top juniper trees or on the ground.
Bald eagles -	Top of coniferous or other large trees or snags, sometimes on rocky pinnacles.
Ferruginous hawks -	On rocky ledges or along cliffs; on junipers; on any small rocky outthrust; ground nesting not uncommon, especially on ridges or on edge of eroded gullies.
Rough-legged hawk -	Does not nest in Wyoming.
Red-tailed hawk -	On large branches of cottonwood or coniferous trees; on cliffs, in juniper trees.
Swainson's hawk -	Often nests in vicinity of agricultural lands; seems to be equally at home in cultivated or wild areas; may nest in any tree or shrub.
Peregrine & Prairie falcons -	Always nest in depressions or clefts in cliffs or high river banks, etc.; usually lays eggs directly on ground in small "scrape"

Sparrow hawk -	Usually nests in some kind of hole in a tree or where broken branch or rotting tree has formed a cavity; also nests in niches or holes in cliffs.
Pigeon hawk -	Rare nester in Wyoming ; may nest in other bird's abandoned stick nests, in holes or cavities in trees, or even on bare ground under shrubs.
Goshawk -	High up in conifers, cottonwoods, aspen, or other high trees. A medium-sized stick nest; may use other large birds' nests.
Cooper hawk -	May nest in mature conifer stands, or in the river bottoms in aspen, maple, or oak.
Sharp-shinned hawk -	Nests in stunted conifer forests or brushy oak-maple hillsides. Usually found nesting in fairly dense vegetation.
Marsh hawk -	Nest consists of sticks and grasses on the ground or on low vegetation.
Osprey -	Generally nests within about two miles of water, and most frequently nests on shores of lakes or rivers. Nest is a large structure of twigs and branches, placed in top of dead snag or tree.
Turkey vulture -	Normally nests in cliffs in crevices or small openings but has been known to nest in a dead tree.
Owls -	Many owls nest in a variety of sites; holes in cliff faces, in other raptor nests, in juniper or pinion trees, in willows or other dense shrubby vegetation; burrowing owls nest exclusively in old animal burrows in the ground. Great horned owls and short-eared owls are two of the more common species throughout the state. Great horned owls may nest on cliff ledges or in holes in cliffs or in old hawk, raven, or other bird nests. Short-eared owls nest on the ground in prairies or marshes, or sometimes in sagebrush.

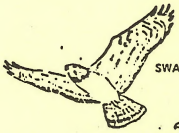
DIURNAL RAPTORS IN FLIGHT

BUTEOS

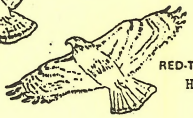
ROUGHLEG HAWK



FERRUGINOUS HAWK



SWAINSON'S HAWK



RED-TAILED Hawk

FALCONS

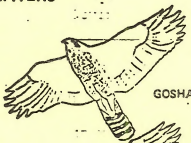
PEREGRINE FALCON

PRAIRIE

MERLIN

AMERICAN KESTREL

ACCIPITERS

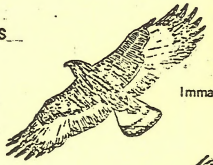


GOSHAWK

COOPERS HAWK

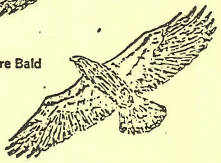
SHARP-SHINNED HAWK

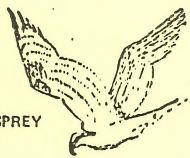
EAGLES



Immature Golden

Immature Bald





OSPREY

TURKEY VULTURE

HARRIER

AVERAGE SIZE OF NESTING AND FEEDING RANGE FOR SELECTED RAPTORS
(Smith and Murphy, 1967-1970) 1/

Raptor species	Home Range (ave.) Sq. Mi.	Diameter (mi.)
Golden eagle	8 - 10	3 - 5
Ferruginous hawk	1 - 3	1 - 2.5
Red-tailed hawk	1.5 - 3.5	2 - 2.5
Swainson's hawk	1.5 - 2	1.5 - 2
Marsh hawk	1.5 - 2	1.5 - 2
Sparrow hawk	.2 - .6	.5 - .8
Prairie falcon	2 - 2.5	1.5 - 2.5
Great horned owl	1.5 - 2.7	1.3 - 2.8
Short-eared owl	1.2 - 1.6	1.2 - 1.8
Raven	1.8 - 2.8	2 - 3

NOTE: The home range or feeding range will vary some according to vegetative composition and topography, which in turn produce the prey on which raptors depend. Also, while it often appears there is considerable overlap in feeding areas between different species of raptors, there is probably less competition for prey than it appears because of (1) slightly different preference in prey species, (2) different feeding or hunting period during the day (or night), and (3) different vegetative types hunted by different species of raptors, or utilization of different ecological niches.

1/ Smith, Dwight G. and Joseph R. Murphy, 1973. Breeding Ecology of Raptors in the Eastern Great Basin of Utah. Bio. Series -- Vol. XVIII, Number 3, Brigham Young University Science Bulletin.

Observed dates of reproductivity of raptors on the Utah study area, 1967.

Species	No. of nests observed	First selection of territory	Earliest laying date	Latest laying date	Average laying date	Earliest hatching date	Latest hatching date	Average hatching date	First brood departure date	Last brood departure date	Average brood departure date	Span of nesting period	Breeding season span
Golden Eagle	3	II/5	III/6	III/18	III/14	IV/15	IV/27	IV/17	VI/12	VII/3	VI/24	117	148
Great Horned Owl	4	II/8	III/20	IV/10	IV/1	IV/24	V/12	IV/28	VI/6	VI/17	VI/11	89	131
Ferruginous Hawk*	8	III/6	IV/3	IV/15	IV/10	V/9	V/17	V/12	VI/18	VI/27	VI/23	85	115
Red-tailed Hawk	4	II/16	III/26	IV/10	IV/7	V/1	V/14	V/7	VI/15	VI/27	VI/20	93	131
Swainson's Hawk	1	-	IV/17	IV/17	IV/17	V/21	V/21	V/21	VII/2	VII/2	VII/2	76	-
Prairie Falcon	0	-	-	-	-	-	-	-	-	-	-	-	-
Marsh Hawk	0	-	-	-	-	-	-	-	-	-	-	-	-
Cooper's Hawk	1	-	IV/12	V/12	V/12	-	-	-	-	-	-	-	-
Sparrow Hawk	3	IV/10	V/4	V/15	V/9	VI/2	VI/17	VI/6	VII/4	VII/21	VII/8	77	102
Short-eared Owl	0	-	-	-	-	-	-	-	-	-	-	-	-
Burrowing Owl	0	-	-	-	-	-	-	-	-	-	-	-	-
Raven	4	III/15	III/26	IV/8	III/29	V/1	V/15	V/10	VI/3	VI/15	VI/12	81	92

*Data from Murphy et al., 1969.

Observed dates of reproductivity of raptors on the Utah study area, 1968.

Species	No. of nests observed	First selection of territory	Earliest laying date	Latest laying date	Average laying date	Earliest hatching date	Latest hatching date	Average hatching date	First brood departure date	Last brood departure date	Average brood departure date	Span of nesting period	Breeding Season span
Golden Eagle	4	I/20	II/24	III/16	III/10	IV/5	IV/26	IV/22	VI/24	VII/7	VI/29	133	178
Great Horned Owl	9	XII/2*	I/20	II/10	II/4	II/27	III/13	III/2	III/31	IV/27	IV/20	97	146
Ferruginous Hawk**	9	II/25	IV/4	IV/19	IV/8	V/6	V/22	V/10	VI/12	VII/5	VI/25	92	132
Red-tailed Hawk	7	II/6	III/15	III/19	III/17	IV/18	IV/24	IV/20	VI/27	VII/8	V/29	115	152
Swainson's Hawk	1	-	IV/30	IV/30	IV/30	VI/6	VI/6	VI/6	VII/15	VII/15	VII/15	77	-
Prairie Falcon	1	III/19	-	-	-	-	-	-	-	-	-	-	-
Marsh Hawk	0	-	-	-	-	-	-	-	-	-	-	-	-
Cooper's Hawk	0	-	-	-	-	-	-	-	-	-	-	-	-
Sparrow Hawk	3	IV/11	IV/27	V/4	V/1	V/27	VI/4	VI/2	VI/25	VII/4	VII/2	68	84
Short-eared Owl	0	-	-	-	-	-	-	-	-	-	-	-	-
Burrowing Owl	0	-	-	-	-	-	-	-	-	-	-	-	-
Raven	4	II/17	III/20	III/31	III/24	IV/27	IV/5	V/1	V/3	V/11	V/7	52	83

*December 2, 1967.
**Data from Murphy et al., 1969.

Observed dates of reproductivity of raptors on the Utah study area, 1969.

Species	No. of nests observed	First selection of territory	Earliest laying date	Latest laying date	Average laying date	Earliest hatching date	Latest hatching date	Average hatching date	First brood departure date	Last brood departure date	Average brood departure date	Span of nesting period	Breeding Season span
Golden Eagle	4	II/18	II/21	III/18	III/9	IV/3	IV/30	IV/16	VI/5	VII/9	VI/21	138	150
Great Horned Owl	8	I/2	II/21	III/11	II/28	III/25	IV/12	III/30	V/16	VI/1	V/25	100	150
Ferruginous Hawk	12	III/5	III/28	IV/17	IV/4	V/2	V/26	V/11	VI/10	VI/28	VI/20	92	114
Red-tailed Hawk	0	I/20	III/17	IV/5	III/26	IV/28	V/9	V/2	VI/4	VI/15	VI/12	90	146
Swainson's Hawk	2	IV/12	IV/28	V/8	V/5	V/27	VI/11	VI/1	VII/10	VII/10	VII/10	73	89
Prairie Falcon	0	-	-	-	-	-	-	-	-	-	-	-	-
Marsh Hawk	2	III/31	IV/12*	IV/20*	IV/17*	V/7*	V/10*	V/5	VI/11	VI/18	VI/12	67	80
Cooper's Hawk	0	-	-	-	-	-	-	-	-	-	-	-	-
Sparrow Hawk	2	IV/19	V/14	VI/1	V/17	VI/15	VI/30	VI/18	VII/14	VII/28	VII/19	75	100
Short-eared Owl	0	-	-	-	-	-	-	-	-	-	-	-	-
Burrowing Owl	3	IV/17	V/8**	VI/6**	V/18**	VI/7**	VI/17**	VI/10*	VII/6	VII/9	VII/9	62*	82
Raven	4	II/28	III/27	IV/8	IV/2	V/3	V/18	V/12	VI/11	VI/23	VI/17	88	115

*Computed dates from the 1970 data.
**Computed dates from Bent (1938), Craighead and Craighead (1956).

Observed dates of reproductivity of raptors on the Utah study area, 1970.

Species	No. of nests observed	First selection of territory	Earliest laying date	Latest laying date	Average laying date	Earliest hatching date	Latest hatching date	Average hatching date	First brood departure date	Last brood departure date	Average brood departure date	Span of nesting period	Breeding Season span
Golden Eagle	3	II/2	III/6	III/30	III/21	IV/11	V/14	IV/14	VI/7	VI/21	VI/9	107	139
Great Horned Owl	6	II/1	III/9	III/29	III/23	IV/15	V/2	IV/25	V/30	VI/7	VI/5	88	126
Ferruginous Hawk	7	III/10	III/17	III/21	IV/1	IV/22	IV/28	V/12	VI/4	VII/2	VI/25	99	106
Red-tailed Hawk	4	II/6	III/17	IV/7	III/31	IV/17	V/5	V/2	VI/5	VI/13	VI/11	88	126
Swainson's Hawk	1	IV/13	V/13	V/13	V/13	VI/16	VI/16	VI/16	VII/27	VII/27	VII/27	75	83
Prairie Falcon	2	III/28	IV/20	IV/20	IV/20	V/26	V/26	V/26	VII/2	VII/2	VII/2	74	93
Marsh Hawk	2	IV/2	IV/14	IV/19	IV/17	V/18	V/23	V/21	VI/17	VI/26	VI/22	85	73
Cooper's Hawk	0	-	-	-	-	-	-	-	-	-	-	-	-
Sparrow Hawk	1	V/1	V/18	V/18	V/18	VI/17	VI/17	VI/17	VII/15	VII/15	VII/16	58	75
Short-eared Owl	1	III/6	III/28	III/28	III/28	VI/23	VI/23	VI/23	-	-	-	-	-
Burrowing Owl	3	IV/22	IV/30*	V/5*	V/3*	VI/4*	VI/7*	VI/5*	VII/3	VII/10	VII/6	70*	78
Raven	2	II/21	III/19	III/30	III/27	IV/30	V/3	V/1	VI/6	VI/14	VI/9	87	113

*Computed dates from Bent (1938), Craighead and Craighead (1956).

Summary of nesting site selections of raptors on the study area, 1967-1970.

Species	Quarry Site No.	%	Structure Site No.	%	Tree Site: Pinyon No.	%	Juniper No.	%	Cliffrose No.	%	Cottonwood No.	%
Golden Eagle	4	2.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Great Horned Owl	7	5.0	0	0.0	0	0.0	4	2.8	0	0.0	0	0.0
Ferruginous Hawk	0	0.0	0	0.0	0	0.0	24	17.0	1	0.7	0	0.0
Red-tailed Hawk	2	1.4	0	0.0	3	2.1	7	5.0	1	0.0	1	0.7
Swainson's Hawk	0	0.0	0	0.0	0	0.0	5	3.5	0	0.0	0	0.0
Prairie Falcon	1	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Marsh Hawk	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Cooper's Hawk	0	0.0	0	0.0	0	0.0	1	0.7	0	0.0	0	0.0
Sparrow Hawk	5	3.5	2	1.4	0	0.0	2	1.4	0	0.0	0	0.0
Short-eared Owl	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Burrowing Owl	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Raven	1	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Totals	20	14.1	2	1.4	3	2.1	43	30.4	2	0.7	1	0.7

Species	Ground Site: Sagebrush No.	%	Shadscale No.	%	Greasewood No.	%	Cliff Site: 5-25 No.	%	25-75 No.	%	75-150 No.	%
Golden Eagle	0	0.0	0	0.0	0	0.0	0	0.0	9	6.4	1	0.7
Great Horned Owl	0	0.0	0	0.0	0	0.0	3	2.1	13	9.2	0	0.0
Ferruginous Hawk	8	5.7	3	2.1	0	0.0	0	0.0	0	0.0	0	0.0
Red-tailed Hawk	0	0.0	0	0.0	0	0.0	2	1.4	5	3.5	1	0.7
Swainson's Hawk	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Prairie Falcon	0	0.0	0	0.0	0	0.0	0	0.0	2	1.4	0	0.0
Marsh Hawk	2	1.4	2	1.4	0	0.0	0	0.0	0	0.0	0	0.0
Cooper's Hawk	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Sparrow Hawk	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Short-eared Owl	1	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Burrowing Owl	0	0.0	1	0.7	5	3.5	0	0.0	0	0.0	0	0.0
Raven	0	0.0	0	0.0	0	0.0	3	2.1	7	5.0	3	2.1
Totals	11	7.8	6	4.2	5	3.5	8	5.6	36	25.5	5	3.5

Summary of exposures of occupied nests, 1967-1970.

Species	North No.	%	West No.	%	South No.	%	East No.	%
Golden Eagle	4	2.8	4	2.8	3	2.1	3	2.1
Great Horned Owl	1	0.7	15	10.6	8	5.7	3	2.1
Ferruginous Hawk	3	2.1	10	7.1	15	10.6	8	5.7
Red-tailed Hawk	4	2.8	6	4.3	6	4.3	5	3.5
Swainson's Hawk	0	0.0	0	0.0	1	0.7	4	2.8
Prairie Falcon	1	0.7	2	1.4	0	0.0	0	0.0
Marsh Hawk	0	0.0	0	0.0	0	0.0	4	2.8
Cooper's Hawk	0	0.0	1	0.7	0	0.0	0	0.0
Sparrow Hawk	4	2.8	1	0.7	3	2.1	1	0.7
Short-eared Owl	0	0.0	0	0.0	0	0.0	1	0.7
Burrowing Owl	0	0.0	0	0.0	0	0.0	6	4.3
Raven	4	2.8	8	5.7	2	1.4	0	0.0
Totals	21	14.7	47	33.3	38	26.9	35	24.7

Summary of reoccupation of nesting sites and territories.

Species	No. years occupation of a nest site								No. years territorial occupation*								Total no. of sites
	1		2		3		4		1		2		3		4		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Golden Eagle	5	55.6	2	22.3	2	22.2	0	0.0	0	0.0	0	0.0	2	40.0	3	60.0	9
Great Horned Owl	8	40.0	7	40.7	1	6.7	1	6.7	0	0.0	4	40.0	3	30.0	3	30.0	15
Ferruginous Hawk	18	75.0	2	8.3	3	12.5	1	4.2	1	7.7	2	15.4	4	30.8	6	46.2	24
Red-tailed Hawk	8	57.1	3	35.7	1	7.1	0	0.0	0	0.0	1	14.3	1	14.3	5	71.4	14
Swainson's Hawk	1	33.3	2	66.7	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0	3
Prairie Falcon	3	100.0	0	0.0	0	0.0	0	0.0	1	33.0	2	67.0	0	0.0	0	0.0	3
Marsh Hawk	5	100.0	0	0.0	0	0.0	0	0.0	1	100.0	2	67.0	0	0.0	0	0.0	5
Cooper's Hawk	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	1
Sparrow Hawk	4	66.7	1	16.7	1	16.7	0	0.0	0	0.0	1	25.0	3	75.0	0	0.0	6
Short-eared Owl	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	1
Burrowing Owl	6	100.0	0	0.0	0	0.0	0	0.0	2	50.0	2	50.0	0	0.0	0	0.0	6
Raven	2	33.3	1	16.7	2	33.3	1	16.7	0	0.0	0	0.0	0	0.0	4	100.0	6
Totals	60	71.75	20	17.9	10	8.2	3	2.3	8	36.7	14	23.2	13	15.8	22	29.7	93

*Totals include nesting and non-nesting pairs.

Summary of frequency distribution of raptor clutch sizes from 1967-1970.

Species	No. eggs in clutch						
	1	3	3	4	5	6	7
Golden Eagle	0	13	1	0	0	0	0
Great Horned Owl	1	5	13	3	0	0	0
Ferruginous Hawk	0	5	13	16	0	0	0
Red-tailed Hawk	0	4	13	2	0	0	0
Swainson's Hawk	0	4	1	0	0	0	0
Prairie Falcon	0	0	0	0	1	0	0
Marsh Hawk	0	0	1	0	0	0	1
Cooper's Hawk	0	0	1	0	0	0	0
Sparrow Hawk	0	0	0	3	3	1	2
Short-eared Owl	0	0	0	0	0	0	1
Burrowing Owl	?	?	?	?	?	?	?
Raven	0	0	1	3	4	2	4
Totals	1	31	44	27	8	3	9

Summary of productivity of raptor nesting populations, 1967.

Species	No. complete clutches	Av. clutch size	Range of clutch size	Total no. of eggs produced	No. young hatched	Percent young hatched	No. young fledged	Percent young fledged
Golden Eagle	3	2.0	–	6	4	66.7	2	33.3
Great Horned Owl	4	2.0	1–3	8	8	100.0	8	100.0
Ferruginous Hawk	6	2.5	2–4	15	8	53.3	7	46.7
Red-tailed Hawk	4	2.5	2–3	10	7	70.0	6	60.0
Swainson's Hawk	1	2.0	–	2	2	100.0	1	50.0
Prairie Falcon	0	–	–	–	–	–	–	–
Marsh Hawk	9	–	–	–	–	–	–	–
Cooper's Hawk	1	3.0	–	?	?	?	?	?
Sparrow Hawk	2	4.5	4–5	9	?	?	?	?
Short-eared Owl	0	–	–	–	–	–	–	–
Burrowing Owl	0	–	–	–	–	–	–	–
Raven	4	5.2	4–7	21	15	71.4	12	57.1
Totals	34	–	–	71	44	–	36	–

Summary of productivity of raptor nesting populations, 1968.

Species	No. complete clutches	Av. clutch size	Range of clutch size	Total no. of eggs produced	No. young hatched	Percent young hatched	No. young fledged	Percent young fledged
Golden Eagle	4	2.0	–	8	4	50.8	3	37.5
Great Horned Owl	8	3.0	2–4	24	21	87.5	15	62.5
Ferruginous Hawk	9	3.7	3–4	33	21	63.6	19	57.6
Red-tailed Hawk	5	2.8	2–3	14	11	78.6	8	57.1
Swainson's Hawk	1	2.0	–	2	2	100.0	2	100.0
Prairie Falcon	1	?	?	?	0	–	–	–
Marsh Hawk	0	–	–	–	–	–	–	–
Cooper's Hawk	0	–	–	–	–	–	–	–
Sparrow Hawk	3	5.7	4–7	17	14	82.4	9	52.9
Short-eared Owl	0	–	–	–	–	–	–	–
Burrowing Owl	0	–	–	–	–	–	–	–
Raven	4	5.0	3–6	20	16	80.0	10	50.0
Totals	35	–	–	118	89	–	66	–

Summary of productivity of raptor nesting populations, 1969.

Species	No. complete clutches	Av. clutch size	Range of clutch size	Total no. of eggs produced	No. young hatched	Percent young hatched	No. young fledged	Percent young fledged
Golden Eagle	4	2.2	2–3	9	3	33.3	3	33.3
Great Horned Owl	6	3.3	3–4	20	16	80.0	14	70.0
Ferruginous Hawk	12	3.7	3–4	44	36	81.8	32	81.8
Red-tailed Hawk	6	3.0	2–4	18	16	88.9	13	72.2
Swainson's Hawk	2	2.5	2–3	5	5	100.0	2	40.0
Prairie Falcon	0	–	–	–	–	–	–	–
Marsh Hawk	2	?	?	?	?	?	5	?
Cooper's Hawk	0	–	–	–	–	–	–	–
Sparrow Hawk	2	4.5	4–5	9	9	100.0	4	44.4
Short-eared Owl	0	–	–	–	–	–	–	–
Burrowing Owl	3	?	?	?	?	?	8	?
Raven	4	5.5	4–7	22	10	45.5	9	40.9
Totals	41	–	–	127	95	–	90	–

Summary of productivity of raptor nesting populations, 1970.

Species	No. complete clutches	Av. clutch size	Range of clutch size	Total no. of eggs produced	No. young hatched	Percent young hatched	No. young fledged	Percent young fledged
Golden Eagle	3	2.0	–	6	6	100.0	6	100.0
Great Horned Owl	4	2.5	2–3	10	9	90.0	7	70.0
Ferruginous Hawk	7	3.0	2–4	21	13	61.9	10	47.6
Red-tailed Hawk	4	3.3	3–4	13	9	69.2	6	46.2
Swainson's Hawk	1	2.0	–	2	2	100.0	2	100.0
Prairie Falcon	1	5.0	–	5	3	60.0	1	20.0
Marsh Hawk	2	5.0	3–7	10	7	70.0	5	50.0
Cooper's Hawk	0	–	–	–	–	–	–	–
Sparrow Hawk	1	5.0	–	5	5	100.0	4	80.0
Short-eared Owl	1	7.0	–	7	6	85.7	0	0.0
Burrowing Owl	3	?	?	?	?	?	12	?
Raven	2	6.0	5–7	12	10	85.0	5	41.7
Totals	29	–	–	91	–	–	58	–

Identification of prey species frequently utilized by Birds of Prey
(As used in accompanying tables)
(Smith and Murphy, 1973)

Lepus californicus	jackrabbit
Sylvilagus sp.	cottontail
Ammospermophilus leucurus	whitetail antelope squirrel
Perognathus formosus	longtail pocket mouse
Zenaidura macroura	mourning dove
Chondestes grammacus	lark sparrow
Buteo swainsoni	Swainson's hawk
Asio flammeus	short-eared owl
Mustela frenata	long-tailed weasel
Otocoris alpestris	
Neotoma lepida	wood rat
Perognathus parvus	pocket mouse
Dipodomys microps	Great Basin kangaroo rat
Microtus sp.	voles
Peromyscus maniculatus	deer mouse
Cyanocephalus cyanocephalus	
Phalaenoptilus nuttallii	poor will
Scorpionida	scorpions
Dipodomys ordii	Ord kangaroo rat
Microdipodops megacephalus	dark kangaroo mouse
Onychomys leucogaster	northern grasshopper mouse
Otocoris alpestris	
Pica pica	rock rabbit
Calamospiza melanocorys	lark bunting
Pooecetes gramineus	vesper sparrow
Pituophis melanoleucus	pine snake
Cnemidophorus tigris	tiger racerunner (snake)
Eutamias minimus	least chipmunk
Sialia currucoides	mountain bluebird
Sturnis vulgaris	starling
Masticophis taeniatus	coachwhip (snake)
Thomomys bottae	Valley pocket gopher
Tyrannus verticalis	Western kingbird
Crotaphytus collaris	collared lizard
Lanius ludovicianus	loggerhead shrike
Oreoscoptes montanus	sage thrasher
Sayornis saya	Say's phoebe
Zonotrichia leucophrys	white-crowned sparrow
Locustidae	locusts
Carabidae	beetle
Gryllidae	
Tenebrionidae	
Sturnella neglecta	Western meadowlark
Passer domesticus	english sparrow
Reithrodontomys Megalotis	Western harvest mouse
Uta stansburiana	lizard
Phrynosoma platyrhinos	horned lizard
Spizella passerina	chipping sparrow

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	155	74.5	356,500	88.6
Sylvilagus sp.	43	20.8	43,000	10.7
Ammospermophilus leucurus	3	1.4	435	0.1
Perognathus formosus	1	0.5	19	Tr.*
Zenaidura macroura	1	0.5	153	Tr.
Chondestes grammacus	1	0.5	30	Tr.
Buteo swainsoni	2	1.0	988	0.5
Asio flammeus	1	0.5	340	Tr.
Totals	207	99.7	401,465	99.9

*Present in trace amounts only.

Food habits of Golden Eagles in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	68	57.1	158,400	80.5
Sylvilagus sp.	35	29.4	35,000	18.0
Ammospermophilus leucurus	9	7.6	1,305	0.7
Mustela frenata	2	1.7	356	0.2
Zenaidura macroura	1	0.8	153	0.1
Otocoris alpestris	3	2.5	58	Tr.*
Buteo swainsoni	1	0.8	988	0.5
Totals	119	99.9	194,258	100.0

*Present in trace amounts only.

Food habits of Great Horned Owls in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	165	58.9	379,500	91.4
Sylvilagus audubonl	32	11.4	32,000	7.7
Neotoma lepida	6	2.1	1,302	0.3
Perognathus parvus	2	0.7	30	Tr.*
Dipodomys microps	8	2.9	520	0.1
Dipodomys ordii	11	3.9	748	0.2
Microtus sp.	5	1.8	190	Tr.
Peromyscus maniculatus	7	2.5	119	Tr.
Cyanocephalus cyanocephalus	3	1.1	50	Tr.
Zenaidura macroura	5	1.8	765	0.2
Phalaenoptilus nuttallii	1	0.4	62	Tr.
Scorpionida	35	12.5	30	Tr.
Totals	280	100.0	415,316	100.0

*Present in trace amounts only.

Food habits of Great Horned Owls in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	83	49.1	190,900	89.6
Sylvilagus sp .	19	11.2	19,900	8.9
Neotoma lipida	1	0.6	217	0.1
Dipodomys ordii	24	14.2	1,632	0.8
Dipodomys microps	3	1.8	195	0.1
Peromyscus maniculatus	12	7.1	204	0.1
Microdipodops megacephalus	2	1.2	48	Tr.
Onychomys leucogaster	3	1.8	114	Tr.
Zenaidura macroura	4	2.4	612	0.3
Otocoris alpestris	1	0.6	28	Tr.
Pica pica	1	0.6	173	Tr.
Scorpionida	16	9.5	14	Tr.
Totals	169	100.1	214,037	99.9

*Present in trace amounts only.

Food habits of Ferruginous Hawks in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	105	57.7	241,500	95.0
Sylvilagus sp.	6	3.3	6,000	2.4
Ammospermophilus leucurus	18	9.9	2,610	1.0
Spermophilus townsendi	2	1.1	382	0.2
Perognathus parvus	1	0.5	15	Tr.
Dipodomys ordii	25	13.7	1,700	0.6
Dipodomys microps	2	1.1	130	Tr.
Onychomys leucogaster	1	0.5	38	Tr.
Peromyscus maniculatus	4	2.2	68	Tr.
Otocoris alpestris	9	4.9	252	0.1
Calamospiza melanocorys	3	1.6	150	Tr.
Zenaidura macroura	1	0.5	153	Tr.
Pooecetes gramineus	2	1.1	100	Tr.
Pituophis melanoleucus	2	1.1	744	0.3
Cnemidophorus tigris	1	0.5	24	Tr.
Totals	182	99.7	253,866	99.6

*Present in trace amounts only.

Food habits of Ferruginous Hawks in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Lepus californicus	97	56.4	223,100	93.0
Sylvilagus sp.	13	7.6	13,000	5.4
Amospermophilus leucurus	8	4.7	1,160	0.5
Perognathus parvus	3	1.7	45	Tr.
Dipodomys ordii	17	9.9	1,156	0.5
Dipodomys microps	6	3.5	390	0.2
Peromyscus maniculatus	9	5.2	153	Tr.
Otocoris alpestris	14	8.1	392	0.2
Pooecetes gramineus	1	0.6	30	Tr.
Oreoscoptes montanus	1	0.6	33	Tr.
Pituophis melanoleucus	3	1.7	372	0.2
Totals	172	100.0	239,831	100.0

*Present in trace amounts only.

Food habits of Red-tailed Hawks in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus	111	58.4	255,300	92.5
Sylvilagus sp.	17	8.9	17,000	6.2
Spermophilus townsendi	4	2.1	764	0.3
Eutamias minimus	2	1.0	146	Tr.
Peromyscus maniculatus	13	6.8	221	Tr.
Microtus sp.	22	11.6	836	0.3
Otocoris alpestris	6	3.2	168	Tr.
Sialia currucoides	1	0.5	45	Tr.
Cyanocephalus cyanocephalus	7	3.7	350	Tr.
Sturnis vulgaris	3	1.6	252	Tr.
Pituophis melanoleucus	1	0.5	372	0.1
Masticophis taeniatus	3	1.6	507	0.2
Totals	190	99.9	275,961	99.6

*Present in trace amounts only.

Food habits of Red-tailed Hawks in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus	71	50.7	163,300	90.0
Sylvilagus sp.	15	10.7	15,000	8.2
Spermophilus townsendi	1	0.7	191	0.1
Ammospermophilus leucurus	9	6.4	1,304	0.7
Peromyscus maniculatus	26	18.6	442	0.2
Microtus sp.	1	0.7	38	Tr.
Thomomys bottae	2	1.6	340	0.2
Otocoris alpestris	3	2.1	84	Tr.
Tyrannus verticalis	1	0.7	38	Tr.
Sturnis vulgaris	9	6.4	756	0.4
Pituophis melanoleucus	1	0.7	372	0.2
Crotaphytus collaris	1	0.7	30	Tr.
Totals	140	100.0	181,893	100.0

*Present in trace amounts only.

Food habits of Swainson's Hawks in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus	42	51.2	96,600	95.0
Sylvilagus sp.	4	4.9	4,000	3.9
Peromyscus maniculatus	7	8.5	119	0.1
Microtus sp.	3	3.7	114	0.1
Spermophilus townsendi	1	1.2	191	0.2
Calamospiza melanocorys	3	3.7	99	0.1
Lanius ludovicianus	1	1.2	52	0.1
Oreoscoptes montanus	1	1.2	45	Tr.
Sayornis saya	2	2.4	56	0.1
Zonotrichia leucophrys	1	1.2	30	Tr.
Pituophis melanoleucus	1	1.2	372	0.4
Locustidae	15	18.3	95	Tr.
Carabidae	1	1.2	0.23	Tr.
Totals	82	99.9	101,688	100.0

*Present in trace amounts only.

Food habits of Swainson's Hawks in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus	15	19.0	34,500	78.2
Sylvilagus audoboni	9	11.4	9,000	20.4
Peromyscus maniculatus	2	2.5	34	0.1
Microtus sp.	1	1.3	38	0.1
Otocoris alpestris	11	13.9	308	0.7
Unident. Passerines	8	10.1	240	0.5
Locustidae	17	21.5	11	Tr.
Carabidae	5	6.3	1	Tr.
Tenebrionidae	2	2.5	1	Tr.
Gryllidae	9	11.4	4	Tr.
Totals	79	99.9	44,137	100.0

*Present in trace amounts only.

Food habits of Prairie Falcons in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Ammospermophilus leucurus	5	19.2	725.0	20.6
Peromyscus maniculatus	1	3.8	17.0	0.5
Lepus californicus (juv.)	2	7.7	2,300.0	65.2
Otocoris alpestris	7	26.9	198.0	5.6
Oberholseria chlorura	1	3.8	30.0	0.9
Pooecetes gramineus	1	3.8	27.0	0.7
Sturnis vulgaris	3	11.5	84.0	2.4
Sturnella neglecta	1	3.8	145.0	4.1
Locustidae	5	19.2	3.2	Tr.
Totals	26	99.7	3,527.2	100.0

*Present in trace amounts only.

Food habits of Marsh Hawks in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus (juv.)	12	31.6	1,200.0	50.1
Spermophilus townsendi	5	13.2	755.0	31.5
Peromyscus maniculatus	7	18.4	119.0	5.0
Reithrodontomys Megalotis	2	5.3	24.0	1.0
Otocoris alpestris	4	10.5	112.0	4.7
Zenaidura macroura	1	2.6	153.0	6.4
Pooecetes gramineus	1	2.6	30.0	1.0
Carabidae	6	15.8	1.4	1.3
Totals	38	100.0	2,394.4	101.0

*Present in trace amounts only.

Food habits of Short-eared Owls in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Dipodomys ordii	7	20.0	476	37.4
Reithrodontomys megalotis	2	5.7	24	1.9
Peromyscus maniculatus	19	54.3	323	25.9
Perognathus parvus	3	8.6	45	3.5
Unidentified passerine	1	2.9	30	2.4
Sturnis vulgaris	1	2.9	84	6.6
Sturnella neglecta	2	5.7	290	22.6
Totals	35	100.1	1,272	100.3

Food habits of Burrowing Owls in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Dipodomys ordii	11	12.4	748.0	73.1
Perognathus formosus	1	1.1	19.0	1.9
Microtus sp.	2	2.2	76.0	7.4
Phalaenoptilus nuttali	1	1.1	62.0	6.0
Otocoris alpestris	3	3.3	84.0	8.2
Uta stansburiana	1	1.1	4.0	0.3
Locustidae	29	32.6	18.3	1.9
Scarabidae	19	21.3	5.7	0.6
Silphidae	11	12.4	3.3	0.3
Carabidae	7	7.9	1.6	0.2
Tenebrionidae	2	2.2	1.1	0.1
Aranae	2	2.2	0.8	Tr.
Totals	89	99.8	1,023.8	100.0

*Present in trace amounts only.

Food habits of Burrowing Owls in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass
Dipodomys ordii	4	5.5	272.0	61.9
Peromyscus maniculatus	2	2.7	34.0	7.7
Reithrodontomys megalotis	1	1.4	12.0	2.7
Otocoris alpestris	2	2.7	56.0	12.7
Passer domesticus	1	1.4	25.0	5.7
Uta stansburiana	3	4.2	12.0	2.7
Locustidae	34	46.6	21.4	4.9
Silphidae	13	17.8	3.9	0.9
Carabidae	8	11.0	1.8	0.4
Scarabidae	5	6.8	1.5	0.3
Totals	73	100.1	439.6	99.9

Food habits of Marsh Hawks in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus	5	13.5	5,000.0	86.9
Peromyscus maniculatus	15	40.5	255.0	4.4
Spermophilus townsendi	1	2.7	191.0	3.3
Otocoris alpestris	7	18.9	196.0	3.4
Pooecetes gramineus	3	8.1	81.0	1.4
Dermestidae	5	13.5	1.2	Tr.
Crotaphytus collaris	1	2.7	30.0	0.5
Totals	37	99.9	5,754.2	99.9

*Present in trace amounts only.

Food habits of Sparrow Hawks in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Microtus sp.	5	6.5	190.0	17.6
Peromyscus maniculatus	18	23.4	306.0	28.3
Otocoris alpestris	6	7.8	168.0	15.6
Sialia currucoides	2	2.6	90.0	8.3
Passer domesticus	2	2.6	50.0	4.6
Sturnis vulgaris	3	3.9	252.0	23.3
Uta stansburiana	1	1.3	4.0	0.4
Aranae	2	2.6	0.8	Tr.
Locustidae	29	37.6	18.3	1.7
Curculionidae	7	9.1	0.7	Tr.
Uniden. Coleoptera	2	2.6	0.6	Tr.
Totals	77	100.0	1,080.4	99.8

*Present in trace amounts only.

Food habits of Sparrow Hawks in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Peromyscus maniculatus	7	21.2	119.0	30.4
Passer domesticus	3	9.1	75.0	19.2
Sturnis vulgaris	2	6.1	168.0	42.9
Uta stansburiana	3	9.1	12.0	3.1
Phrynosoma platyrhinos	1	3.0	9.0	2.3
Locustidae	13	39.4	8.2	2.1
Curculionidae	4	12.1	0.4	Tr.
Totals	33	100.0	391.6	100.0

*Present in trace amounts only.

Food habits of Ravens in 1969.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Lepus californicus (juv)	19	31.1	19,000.0	95.6
Peromyscus maniculatus	12	19.7	204.0	1.0
Microtus sp.	3	4.9	114.0	0.6
Neotoma lepida	1	1.6	217.0	1.1
Spizella passerina	1	1.6	38.0	0.2
Passer domesticus	3	4.9	75.0	0.4
Oreoscoptes montanus	1	1.6	45.0	0.2
Masticophis taeniatus	1	1.6	169.0	0.9
Dermestidae	9	14.8	0.9	Tr.
Silphidae	6	9.8	1.8	Tr.
Curculionidae	2	3.3	0.2	Tr.
Unident. Coleoptera	3	4.9	0.9	Tr.
Totals	61	99.8	19,864.8	100.0

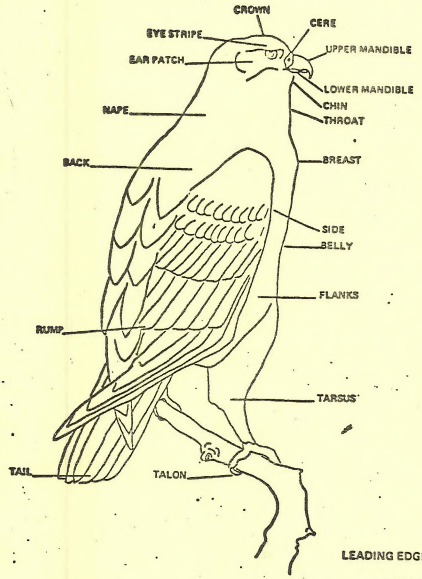
*Present in trace amounts only.

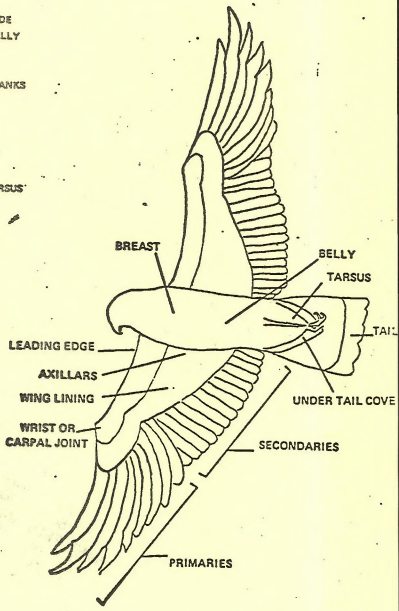
Food habits of Ravens in 1970.

Species	No. Indv.	% Indv.	Approx. Biomass	% Biomass*
Sylvilagus sp.	6	16.7	6,000.0	90.7
Peromyscus maniculatus	13	36.1	221.0	3.3
Otocoris alpestris	4	11.1	112.0	1.7
Sturnis vulgaris	1	2.8	84.0	1.3
Masticophis taeniatus	1	2.8	169.0	2.6
Sceloporous grasciosus	2	5.6	26.0	0.4
Unident. Coleoptera	9	25.0	2.7	Tr.
Totals	36	100.1	6,614.7	100.0

*Present in trace amounts only.

TOPOGRAPHY OF A RAPTOR





BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Bureau of Land Management
Library
Denver Service Center

R'S CARD
8 1976
in the Rawlins
ngs Districts,

OFFICE	DATE RETURNED

(Continued on reverse)

QL 696 .F3 R378 1976

Raptor survey in the Rawlins and Rock Springs Districts,

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225